20

5

What is claimed is:

- 1. A support for an anode system in contact with a molten salt bath in an electrolysis apparatus, said support comprising a 50% to 95% dense castable refractory subject to attack by gases from the bath, where the refractory comprises refractory material and from 2 wt% to 20 wt.% of metal fibers, where the metal fibers are from 1 cm to 4 cm long and have a length to thickness ratio of 500:1 to 20:1.
- 2. The support of Claim 1, comprising at least 55% of alumina castable refractory.
 - 3. The support of Claim 1, wherein the metal fibers are selected from the group consisting of stainless steel, nickel alloy, copper alloy and mixtures thereof.
- 4. The support of Claim 1, wherein the metal fibers are stainless steel and the metal fibers have a coating comprising an oxide of phosphorous.
- 5. The support of Claim 1, wherein the metal fibers have a concave cross-section.
- 6. The support of Claim 1, wherein the electrolysis apparatus is an aluminum producing apparatus, the molten metal salt bath is molten cryolite at about 850°C to 1050°C, and the gases include HF and O_2 .
- 7. A support assembly for an inert anode system comprising at least one inert anode in contact with a molten salt bath in a metal electrolysis apparatus, where the at least one inert anode is attached to a support system having an outer side subject to attack

15

20

5

by gases from the bath, the support system consisting essentially of a 50% to 95% dense castable refractory material having from 2 wt% to 20 wt% of metal fibers dispersed therethrough, where the fibers are from 1 cm to 4 cm long, and where no more than 20 fibers per sq. cm. on average protrude through the outer side of the support system.

- 8. The support assembly of Claim 7, comprising at least 55% alumina castable refractory.
- 9. The support assembly of Claim 7, wherein the metal fibers are selected from the group consisting of stainless steel, nickel alloy, copper alloy and mixtures thereof.
- 10. The support assembly of Claim 7, wherein the metal fibers are stainless steel and the metal fibers have a coating comprising an oxide of phosphorus.
- 11. The support assembly of Claim 7, wherein the metal fibers have a concave cross-section and a length to thickness ratio of 500:1 to 20:1.
- 12. The support assembly of Claim 7, wherein the electrolysis apparatus is an aluminum producing apparatus, the molten salt bath is molten cryolite at about 850°C to 1050°C, and the gases include HF and O_2 .
- 13. The support assembly of Claim 7, wherein the support consists essentially of 3 wt.% to 10 wt.% stainless steel fibers and from about 1 wt.% to about 45 wt.% filler, with the remainder a mixture of an Al₂O₃, SiO₂, CaO material system having a maximum service temperature of at least 1200°C.

15

20

5

- 14. The support assembly of Claim 7, wherein the fibers have a non-circular cross-section and have a generally random dispersal arrangement to themselves, the fibers are present at from about 3 wt% to 10 wt.% and the support system is 50% to 95% dense.
- 15. The support assembly of Claim 7, wherein the fibers have a length to thickness ratio of 100:1 to 50:1
- 16. The support assembly of Claim 10, wherein the phosphate coating is from about 0.5 nanometers to about 5 nanometers thick.
- 17. An electrolytic reduction cell for the production of aluminum comprising at least one inert anode attached to a castable refractory support where the anodes and support are in contact with a molten salt bath in an electrolysis apparatus, where the support comprises a 50% to 95% dense castable refractory subject to attack by gases from the bath, where the refractory comprises refractory material and from 2 wt.% to 20 wt.% of metal fibers, where the metal fibers are from 1 cm to 4 cm long and have a length to thickness ratio of 500:1 to 20:1.
- 18. The cell of Claim 17, wherein the support comprises at least 55% of alumina castable refractory.
- 19. The cell of Claim 17, wherein, in the support, the metal fibers are selected from the group consisting of stainless steel, nickel alloy, copper alloy and mixtures thereof.

5

- 20. The cell of Claim 17, wherein, in the support, the metal fibers are stainless steel and the metal fibers have a coating comprising an oxide of phosphorus.
- 21. The cell of Claim 17, wherein, in the support, the metal fibers have a concave cross-section.
- 22. The cell of Claim 17, wherein the electrolysis apparatus is an aluminum producing apparatus, the molten metal salt bath is molten cryolite at about 850°C to 1050°C, and the gases include HF and O_2 .
- 23. An electrolytic process for making a metal where an electrolyte reduction cell comprising at least one inert anode is attached to a castable refractory support where the anodes and support contact a molten salt bath in an electrolysis apparatus at up to about 1000°C and where corrosive gases contact the inert anode and the support, and where metal is deposited from the molten salt bath, where said support comprises a 50% to 95% dense castable refractory subject to attack by gases from the bath, where the refractory comprises refractory material and from 2 wt.% to 20 wt.% of metal fibers, where the metal fibers are from 1 cm to 4 cm long and have a length to thickness ratio of 500:1 to 20:1.